THE DISTRIBUTION AND ECOLOGY OF *PHILOPEDON PLAGIATUS* (SCHALLER) (COL.: CURCULIONIDAE), WITH PARTICULAR REFERENCE TO INLAND RECORDS

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Introduction

Mr. R. W. J. Read, in an interesting note in this journal, has recorded the occurrence of *Philopedon plagiatus* (Schaller) at two inland sites in Cumbria (Read 1984). As he says, the weevil is most often found on sandy coasts and inland occurrences are few. In this short paper, I have attempted to bring together what is known about *P. plagiatus* in Britain, particularly concentrating on these inland records.

Distribution

On the map (Fig. 1), the vice-county distribution of *P. plagiatus* is shown as given mainly by records in the literature. The distribution is portrayed conventionally, using a single symbol for at least one vice-county record, though in order to give some idea of the normal occurrence of the weevil on the coast these symbols have been positioned off-centre compared to the usual representation in the centre of each vice-county. It is evident that *P. plagiatus* is a very widely distributed weevil in the British Isles. It ranges from West Cornwall to East Kent, is well recorded from Wales, Scotland and Ireland, and extends into the Outer Hebrides, Orkney and the Shetlands (Zetland). It has not been recorded from a few coastal vice-counties: West Sussex, some of the vice-counties in N. Wales, Northumberland South, Mid-Lancaster, and Westmorland, several vice-counties in S. W. Scotland, and the vice-counties represented (three in each case) in the administrative counties of Cork and Galway in Ireland. There can be little doubt that many of these vice-counties are simply under-recorded and that suitable habitats exists in them where *P. plagiatus* is likely to be found.

The dates of the records are very variable, some being very ancient. The occurrence of the weevil in South Essex is based on Stephens (1831, 1839), while the records from Berwick are those of Selby (1844) and Murray (1853), and those for Edinburgh were published by Wilson & Duncan (1834), Murray (1853) and Stephens (1831, 1839). The record from Durham, though repeated by Wingate (1905) and Luff & Sheppard (1980), was originally given by Ornsby (1846).

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At the other extreme, many of the Scottish records are recent ones obtained during surveys of sand dunes and machair sites made by the Institute of Terrestrial Ecology for the Nature Conservancy Council in 1976-1977 (Duffey & Welch 1979). Only the records for the Outer Hebrides have been published (Welch 1979), but these show that *P. plagiatus* occurred, often in large numbers, at 20 sites in the main islands of North and South Uist, Benbecula, Harris and Lewis, and also in the Monach Islands. More recently, the islands of Barra, Vatersay, Pabbay and Bernaray have been added to this list (Waterston 1981), so that the weevil is known from at least 19 10-km squares in the Outer Hebrides.

Records from 16 of the vice-counties included in Fig. 1 have not previously been published. Unless otherwise stated, the records are my own: 19, North Essex; Colne Point, near Clacton, 15.vi.1967. 43, Radnor; Boughrood, swept from marginal, lush vegetation on shingle by R. Wye, 30.vi.1984 (Dr. R. S. Key). 44, Carmarthen; Bertwyn Sands, near Kidwelly, 27.ix.1965. 68, Cheviotland (Northumberland North); Embleton Bay, 13.vii.1972. 73, Kirkcudbright; Southwick Merse, 8.v.1967, etc. (Dr. R. A. Crowson). 75, Ayr; "many localities and dates, e.g. Gailes, 19.vi.1965" (Dr. R. A. Crowson *in litt.*). 85, Fife; Tentsmuir National Nature Reserve, 16/17.vi.1966; also recorded from Tentsmuir by Duffey & Welch (1979). 92, South Aberdeen; Don (Duffey & Welch 1979). 96, Easterness; Whiteness, (Duffey & Welch (1979). 97, Westerness; Sanna Bay, Ardnamurchan, Argyll, 31.vii.1973. 101, Kintyre; Machrihanish Links, 2/3.vi.1981 (Dr. R. C. Welch, *in litt.*). 105, West Ross; Big Sand, near Gairloch, 7.vii.1966. 106, East Ross, Morich More (Duffey & Welch 1979). 107, East Sutherland; Ferry Links, 2.viii.1975 (included in Duffey & Welch 1979). 108, West Sutherland; Invernaver N.N.R., Bettyhill, 28.vii.1972; Strathy Bay, 31.vii.1972, and recorded from all these sites and six others by Duffey & Welch (1979). 109, Caithness; Links of Greenland and Dunnet Links, 3/5.vii.1974; recorded from Dunnet and two other sites by Duffey & Welch (1979).

Inland records

Records from the maritime vice-counties can include inland records as well as those from the coast, which are the greater number. In his Dorset list, Pearce (1926) included Coombe Wood; Wood Street, Wool; and Moreton as localities for *P. plagiatus*; these are about 4½, 5 and 9km from the sea, respectively, in a direct line. Combe Wood is interesting because it occurs on a patch of Reading Beds but is almost completely surrounded by Upper Chalk. I have taken the weevil on Wareham town walls, 12.vi.1981, about 2½ km from the sea, but in an extensive survey of 22 heathland sites in Dorset, using pitfall traps and vacuum netting, no *P. plagiatus* were found (Webb & Hopkins 1984).

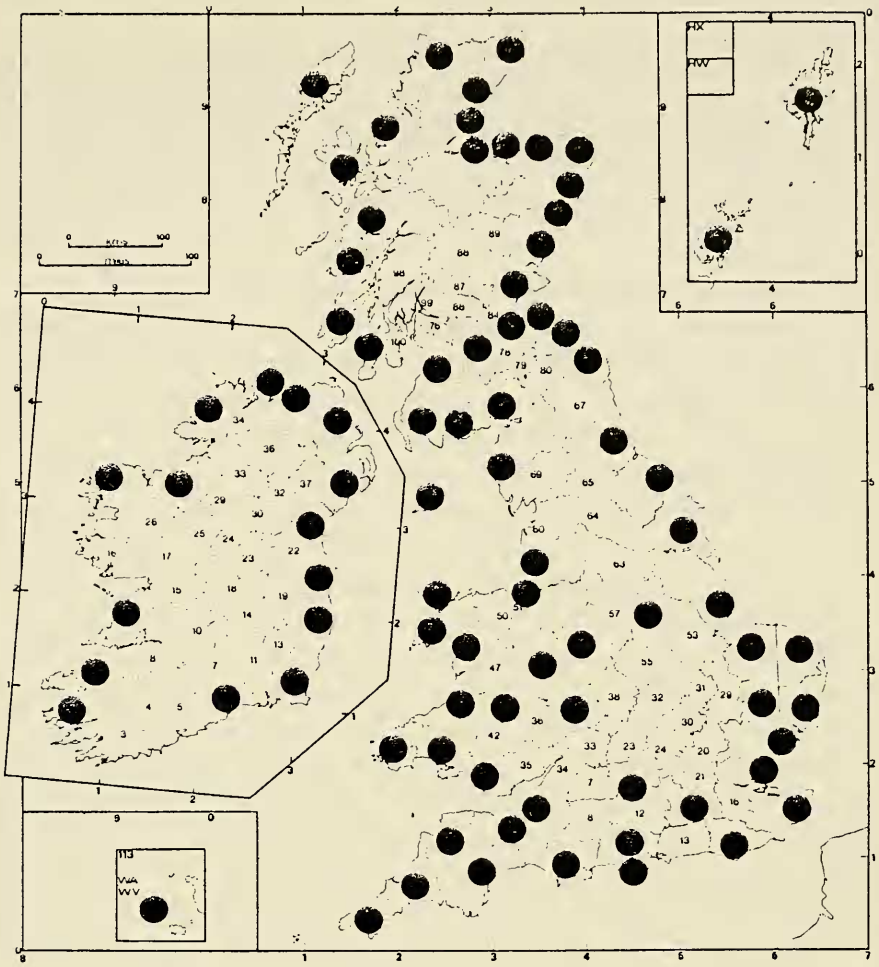

Fig. 1 The vice-county distribution of *Philopedon plagiatus* in the British Isles.

Newbery (1898) recorded the weevil from Foxhall Heath (or Plateau) near Ipswich, East Suffolk, which is a stony and sandy site about 12 km from the sea (though closer to the Orwell Estuary). The site, also known as Foxhall Crag. Pits, was included by Claude Morley in his list of the Coleoptera of Suffolk (1899) and was well known, principally as a site for the rare carabid *Harpalus froelichi* Sturm (Morley 1901). Another inland site for *P. plagiatus* is Risby Warren, near Scunthorpe, Lincolnshire, which is about 8 km from the Humber Estuary and much further from the open sea. Dr. R. S. Key found two dead specimens at the base of marram grass here (SE 933135) on 5.vii.1985 (*in litt.*). Finally, of course, there are the inland records from Cumbria which have already been referred to (Read 1984).

Perhaps more interest attaches to the occurrence of *P. plagiatus* in vice-counties which are entirely land-locked and much further

than just a few km from the sea. There are nine of these vice-counties (Fig. 1).

In Surrey, the weevil has been found in what appear, from the published records, to be at least three distinct sites, almost certainly in three different 10-km squares. Guildford is mentioned by Champion (1900, 1903 and 1915), and a site near Guildford more precisely specified as Compton Heath by Perkins (1915). Allen (1937) found *P. plagiatus* in a sandpit at Dorking, and it has occurred at Witley, a quite different part of Surrey (Champion 1903).

In Berkshire, the only published record of *P. plagiatus* appears to be N. H. Joy's for Wellington College (Fowler & Donisthorpe 1913). This locality is about 1½ km north of Sandhurst and close to the Surrey and, particularly, the North Hampshire borders.

The Suffolk Breckland is a well known area for the occurrence of many 'arenaceous' insects, and *P. plagiatus* is no exception. Most of the early records specify Brandon (Morley 1896, 1899; Jennings 1915), and the nearby Townstreet has also been mentioned (Anon. 1934). Freckenham was a popular collecting site at one time, although the locality is now largely destroyed as such by a combinataion of intensive agriculture and plantation forestry; Donisthorpe recorded the weevil there (1920) and between Mildenhall and Freckenham (1943). Other Breckland localities are Icklingham Plains (Morley 1908) and Barnham, near Thetford (van Emden 1952). My own records, for the period 1962-1966, are from Mildenhall, How Hill, Foxhole Heath and Lakenheath Warren. All the sites included here fall within the four 10-km squares TL67, 77, 78 and 87, and, as far as the records can be precisely located, in Suffolk. I have little doubt, however, that *P. plagiatus* is more widely distributed in the Breckland and that it extends into Norfolk.

The only inland records of the weevil which were specified by Fowler (1891) were for Worcester; Bewdley and Kidderminster were included on the authority of Blatch, but I have been unable to trace any published details. Worcestershire is a very poorly recorded county for Coleoptera, perhaps the least well known of all the English counties. However, Ashe (1921) found *P. plagiatus* at Hartlebury Common, about 2 km south of Kidderminster, though whether this was Blatch's original site cannot now be determined.

Tomlin (1908) recorded *P. plagiatus* from Staffordshire; this record appears to be that of Brown (1863) and from the Burton-on-Trent area. There are no details of the occurrence in Tomlin's account and I have not been able to refer ro Brown's original publication.

The only record of *P. plagiatus* in Shropshire is that of Pendlebury (1937). The rather uninformative details are that the weevil was collected in the Oswestry district by J. Hignett. Although he did not publish, Hignett was a respected coleopterist in his day

and was responsible for the discovery of the weevil *Polydrusus pilosus* Gredler in Britain (Donisthorpe 1935); the occurrence of *Philopedon plagiatus* in Shropshire is certainly not impossible but it would be desirable to know more about its habitat there.

The occurrence of the weevil at Boughrood, Radnor, in 1984 (Dr. R. S. Key), has already been detailed. This is a poorly recorded part of Britain and it is not impossible that other sites could be found in the area.

Bedwell's record of *P. plagiatus* in Sherwood Forest, Notts., was included by Fowler & Donisthorpe (1913) and Carr (1916), though he seems not to have published it himself. Carr also included records from Sherwood Forest by Taylor and by Tomlin. The date of Bedwell's capture was 10.vi.1908.

In Scotland, the only inland record of *P. plagiatus* appears to be that of Crowson (1971) for Dalserf, Lanark, where the weevil was found on the sandy banks of the Clyde.

Although the inland records of *P. plagiatus* cannot compare in abundance and extent with those from the coast, there is a substantial number, sufficient at any rate to dispel the notion that the weevil is a 'coastal species'. However, it is just possible that in some cases *P. plagiatus* could have been confused with the common *Cneorhinus plumbeus* (Marsham). In the 19th century, the latter was often included in the genus *Philopedon* (as *P. exaratus* (Marsham)). It sometimes occurs on sandy soils and occasionally is found with *P. plagiatus*. For instance, Carr (1916) records Bedwell taking both species apparently in the same sandy land at Edwinstowe, Sherwood Forest, on 10.vi.1908.

It should be noted that *P. plagiatus* is wingless and has fused elytra. This means that none of the inland records (or any others) could be due to immigration by flight.

Life history and feeding habits

No detailed ecological study of *P. plagiatus* has been undertaken, but the outlines of its life history and ecology may be inferred from records of occurrence and by piecing together published anecdotal accounts of its feeding habits and other biological features.

Most records of live, adult *P. plagiatus* are from the early summer months of May and June. At the sites surveyed by Duffey & Welch (1979), pitfall traps were set from June to July and the catch collected three times during this period. Numbers were higher in the 'June' and 'June/July' catches than in the 'July' ones, though of course this may reflect activity rather than abundance (exact dates cannot be given because they necessarily varied from site to site). My own records show a preponderance of captures in May, with several occurrences in June and July and fewer in March

and April (Table 1). Again, these records, not being systematic, may reflect activity – in this case that of the collector. Dead specimens of *P. plagiatus* are often found, partly because they can be seen on open biotopes such as sand dunes. My few records of dead weevils are from the period May to September. Several of the occurrences brought forward in these notes as new vice-county records are based on dead specimens, which explains the late dates of a few of them. Only one of my specimens of living *P. plagiatus* was captured after July, but this weevil is of particular interest. It was taken under a piece of wood at Winterton Dunes N. N. R. on 14.ix. 1968, and both the deciduous pupal mandibles are intact. I have not taken any other *P. plagiatus* in this condition. Pupal mandibles are present in 'short-nosed weevils' (Otiorhynchinae and Brachyderinae) for a short period after eclosion of the adults. The weevils use them to dig their way out of pupation sites in the soil, but the mandibles are soon lost (Donisthorpe 1942). The inference would seem clear: larvae of *P. plagiatus* hatch from eggs laid in early summer and develop through the late summer, pupating and emerging as adults in the autumn; this would agree with the statement in Scherf (1964) that the species has a single annual generation. This is the normal life history pattern for weevils, particularly some of the 'short-nosed' species. For instance, leaf weevils, *Phyllobius* and *Polydrusus* species, are often abundant on broad-leaved trees from April to June, decline in numbers thereafter, and are seldom seen in August and following months, except in the north, where this timing is often delayed.

However, the occurrence of *P. plagiatus* in early summer may not be the universal experience. Wilson (1958), summarising Somerset records, noted that it occurred at Burnham in August, September, November and December 1944 (C. N. Hawkins), and again in April 1945; at Berrow in December 1944 (also Hawkins), and in June 1950 (J. Cowley). Records from Dunster (Wilson) and Minehead (Hawkins) were in May 1949 and 1948. No reference is made to dead specimens in the winter months, though this is a possible explanation of the records.

Moreover, the few records of larvae of *P. plagiatus* do not accord with the simple pattern of a single annual generation with active adults occurring from April to July. Van Emden (1952) obtained larvae taken on 14.x.1943 by D. Price-Jones in the Suffolk

	Mar.	Apr.	May	June	July	Aug.	Sep.
Living	1	4	23	13	8	0	1
Dead	0	0	1	1	2	1	2

Tabe 1 Numbers of occurrences of *Philopedon plagiatus* by months, all sites, authors's own records.

Breckland, a single larva collected on 25.v.1936 by Donisthorpe at Swanage, Dorset, and two larvae taken by R. Siemss at Lübeck, North Germany, in April 1934. Van Emden also reared larvae from adults collected on 14.v.1943 in Suffolk (i.e. from eggs laid by the adults). He does not state how long these larvae, which appear to have included last instar individuals, took to develop. though the inference is that they did not overwinter. The occurrence of larvae, probably mature, though this is not stated, in April, May and October does not seem to be compatible with a simple annual life cycle, unless the time of pupation of larvae in the autumn and early winter is very variable. A possible explanation is that development does, or can, take two years. What seems certain is that emergence of active adults in the spring is synchronised, for, unlike most weevils but in common with other 'short-nosed' species such as the leaf weevils, living adults do not seem to be generally obtainable during winter (but cf. Wilson 1958).

Scherf (1964) and others state that *P. plagiatus* feeds on marram grass (*Ammophila arenaria*) and, as Read (1984) says, it is normally associated with that plant. However, most short-nosed weevils (except Sitonini) are polyphagous and there can be no doubt that this is the case with *P. plagiatus*. Apart from the records quoted by Read, nearly all inland populations must feed on plants other than *A. arenaria*, as its distribution is entirely coastal, except for very few introductions (Perring & Walters 1972). The larvae reared by van Emden (1952) came from Breckland adults fed on couch grass (*Agropyron repens*). Seventy years ago, Fryer (1915) showed that *P. plagiatus* was polyphagous, citing Dutch works on its attacks on peas, rhubarb and roses, and his own observations of weevils from Guernsey feeding on runner beans. The association of this weevil with marram grass seems to be a case where the foodplant is the commonest species of the 'yellow dunes' which the weevil normally inhabits. Evan in this biotope, I have seen adults eating other plants, such as saltwort (*Salsola kali*). Champion (1915) and Perkins (1915) gave examples agreeing with Fryer's observations that the weevil is a very polyphagous species, though both authors were quoting from inland experience. Fryer compared *P. plagiatus* with *Otiorhynchus picipes* F. (*singularis* L.), a species with notoriously catholic tastes.

Habitat and habitat changes

Philopedon plagiatus is not strictly a coastal species and is not greatly restricted by its choice of food. The common feature of all its localities is that they are very clearly sandy or arenaceous. The exact nature and origin of the sand at the sites seems to be unimportant. The Dalserf, Lanark, site was a sandy river bank, i.e. alluvial (Crowson 1971), as, presumably, was the Boughrood, Rad-

nor, locality. The Breckland sands are derived from loess and glacial boulder-clay; in some places there are accumulations of blown sand. The Surrey and Berkshire sites are on Tertiary sands and the Worcestershire ones on Bunter sandstone, which is also exposed to the east of Oswestry, Salop (cf. Pendlebury 1937).

The other characteristic of most sites recorded for *P. plagiatus* is that they are open, that is, sparsely vegetated. Sandpits feature as many of the inland localities, particularly those in Surrey. It seems likely that inland sites have become fewer or smaller as vegetation has become denser in response to lack of rabbit grazing and scratching, following myxomatosis, though there is no evidence for this. Afforestation, particularly in the Breckland, has almost certainly reduced the abundance and range of *P. plagiatus* there.

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Note added in proof: Dr. M. L. Luff has kindly provided recent records of *P. plagiatus* from Northumberland: Alnmouth (VC 68, NW 2410), 9 July 1979, and Seaton Sluice (VC 67, NZ 3277), 30 May and 4 July 1980. The latter site is a new, or at least a confirmed, vice-county record.

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COLIAS CROCEUS (GEOFF.) — In Devon one clouded yellow was observed to settle on White Clover at Start Point, Devon, SX820376, on the 26th June, 1986 the wind was southerly. A. J. BALDWIN, 33 Defoe Avenue, Kew Gardens, Surrey.